What is claimed is:

1. A method of extracting information about a fluid-containing porous media comprising:

    a) applying a magnetic field gradient to said media;

    b) applying a first series of oscillating magnetic field pulses to said media, said first series of pulses having an initial magnetic field pulse, a first portion followed by a second portion;

    c) detecting magnetic resonance signals generated in (b);

    d) after a wait time, applying a second series of oscillating magnetic field pulses to said media, said second series of pulses having an initial magnetic field pulse, a third portion followed by said second portion;

    e) detecting magnetic resonance signals generated in (d); and

    f) analyzing said detected signals to determine the presence of one or more magnetic materials in said media.

2. The method of claim 1, wherein said one or more magnetic materials are magnetic minerals.

3. The method of claim 2, wherein said one or more magnetic minerals are paramagnetic minerals selected from the group consisting of hematite, franklinite, chlorite, glauconite, and siderite or ferromagnetic minerals selected from the group consisting of magnetite and pyrrhortite.

4. The method of claim 1, wherein said magnetic field gradient is a static field gradient.

5. The method of claim 1, wherein said magnetic field gradient is a pulsed field gradient.

6. The method of claim 1, wherein analyzing said detected signals includes separating diffusion and relaxation effects.

7. The method of claim 1 further comprising:

g) repeating (d) and (e) one or more times, wherein each additional series of pulses, comprises an initial magnetic field pulse, a modified third portion followed by said second portion.

8. The method of claim 7, wherein analyzing the detected signals includes developing a two-dimensional function describing the diffusion and relaxation of said media.

9. The method of claim 8, further comprising:

h) developing a calibration function describing the relationship between diffusion and relaxation representative of at least one of said one or more magnetic materials;

i) correlating said calibration function to said two-dimensional function; and

j) calculating the relative content of at least one of said one or more magnetic materials in said media.

10. The method of claim 1, further comprising determining the relative content of at least one of said one or more magnetic materials in said media.

11. The method of claim 10 wherein analyzing the detected signals includes developing a diffusion distribution of said media and a diffusion distribution of said fluid in said media.

12. The method of claim 11, wherein determining the relative content of at least one of said one or more magnetic materials includes determining the percentage of magnetic resonance signals having a diffusion coefficient higher than the diffusion coefficient of said fluid.

13. A method of extracting information about a region of fluid-containing earth formation comprising:

a) applying a magnetic field gradient to said region of earth formation;

b) applying a first series of oscillating magnetic field pulses to said region of earth formation, said first series of pulses having an initial magnetic field pulse, a first portion followed by a second portion;

c) detecting magnetic resonance signals generated in (b);

d) after a wait time, applying a second series of oscillating magnetic field pulses to said region of earth formation, said second series of pulses having an initial magnetic field pulse, a third portion followed by said second portion;

e) detecting magnetic resonance signals generated in (d); and

f) analyzing said detected signals to determine the presence of one or more magnetic minerals in said region of earth formation.

14. The method of claim 13, wherein said one or more magnetic minerals are paramagnetic minerals selected from the group consisting of hematite, franklinite, chlorite, glauconite, and siderite or ferromagnetic minerals selected from the group consisting of magnetite and pyrrhortite.

15. The method of claim 13, wherein said magnetic field gradient is a static field gradient.

16. The method of claim 13, wherein said magnetic field gradient is a pulsed field gradient.

17. The method of claim 13, wherein analyzing said detected signals includes separating diffusion and relaxation effects.

18. The method of claim 13 further comprising:

g) repeating (d) and (e) one or more times, wherein each additional series of pulses, comprises a modified third portion followed by said second portion.

19. The method of claim 18, wherein analyzing the detected signals includes developing a two-dimensional function describing the diffusion and relaxation of said region of earth formation.

20. The method of claim 19, further comprising:

h) developing a calibration function describing the relationship between diffusion and relaxation representative of at least one of said one or more magnetic minerals;

i) correlating said calibration function with said two-dimensional function; and

j) calculating the relative content of at least one of said one or more magnetic minerals in said region of earth formation.

21. The method of claim 13, further comprising determining the relative content of at least one of said one or more magnetic minerals in said region of earth formation.

22. The method of claim 21 wherein analyzing the detected signals includes developing a diffusion distribution of said region of earth formation and a diffusion distribution of said fluid in said region of earth formation.

23. The method of claim 22, wherein determining the relative content of at least one of said one or more magnetic minerals includes determining the percentage of magnetic resonance signals having a diffusion coefficient higher than the diffusion coefficient of said fluid.

24. A logging apparatus comprising:

a logging tool that is moveable through a borehole; and

a processor that is coupled with the logging tool, the processor being programmed with instructions which, when executed by the processor:

cause the logging tool to:

i) generate a first series of oscillating magnetic field pulses to said region of earth formation, the first series having an initial magnetic field pulse, a first portion followed by a second portion;

ii) detect magnetic resonance signals produced from the region of earth formation;

iii) after a wait time, apply a second series of oscillating magnetic field pulses to said region of earth formation, said second series having an initial magnetic field pulse, a third portion followed by said second portion;

iv) detect magnetic resonance signals produced from the region of earth formation; and

cause the processor to:

v) analyze the detected magnetic resonance signals to determine the presence of magnetic minerals in the region of investigation.

25. The apparatus of claim 24, wherein (v) includes separating diffusion and relaxation effects.

26. The apparatus of claim 25, wherein (v) includes determining the diffusion coefficient of said region of earth formation.

27. The apparatus of claim 24, wherein the instructions further cause the logging tool to repeat (iii) and (iv) one or more times, wherein each additional series of pulses, comprises an initial magnetic field pulse, a modified third portion followed by said second portion.

28. The apparatus of claim 27, wherein the instructions further cause the processor to develop a two-dimensional function describing the diffusion and relaxation of said region of earth formation.

29. The apparatus of claim 28, wherein the processor is programmed with a calibration function describing the relationship between diffusion and relaxation representative of at least one of said one or more magnetic minerals and wherein the instructions further cause the processor to correlate said calibration function to said two-dimensional function.